

Object-Oriented Programming in Python

Videogames Technology
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Objectives

1. Introduce basic programming concepts.
2. Understand the main characteristics of Object-Oriented Programming (OOP).
3. Use Python to implement class hierarchies
4. Use class libraries

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Understanding concepts

Differentiate between ...

Programming

Set of techniques that allow the development of programs using a programming language.

Programming language

Set of rules and instructions based on a familiar syntax and later translated into machine language which allow the elaboration of a program to solve a problem.

Paradigm

Set of rules, patterns and styles of programming that are used by programming languages.

Programming paradigms types (I)

Declarative programming

Describe **what** is used to calculate through conditions, propositions, statements, etc., but does not specify **how**.

- **Logic:** follows the first order predicate logic in order to formalize facts of the real world. (Prolog)
 - Example: Anne's father is Raul, Raul's mother is Agnes. Who is Ana's grandmother
- **Functional:** it is based on the evaluation of functions (like maths) recursively (Lisp y Haskell).
 - Example: the factorial from 0 and 1 is 1 and n is the factorial from $n * \text{factorial}(n-1)$. What is the factorial from 3?

Programming paradigms types (II)

Imperative programming

Describes, by a set of instructions that change the **program state**, **how** the task should be implemented.

- **Structural:** is based on nesting, loops, conditionals and subroutines. **GOTO** command is forbidden (C, Pascal, Python).
 - Example: reviewing products of a shopping list and add the item X to the shopping if it is available.
- **Object-Oriented Programming**

Programming paradigms types (III)

Object-Oriented Programming

Evolves from imperative programming. It is based on **objects** that allow express the **characteristics** and **behavior** in a closer way to real life.

- **Main characteristics:** abstraction, encapsulation, polymorphism, inheritance, modularity, etc.
- Example: a car has a set of properties (color, fuel type, model) and a functionality (speed up, shift gears, braking).

There are many other paradigms such as Event-Driven programming, Concurrent, Reactive, Generic, etc.